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Reconstruction of longitudinal phase space at GSI-High Charge State Injector

The High Charge State Injector (HLI) at GSI Helmholtzzentrum für Schwerionenforschung (GSI) in Darmstadt, Germany, provides a heavy ion beam for the Helmholtz Linear Accelerator (HELIAC). The HELIAC is currently under development and will be the first accelerator using superconducting (SC) multigap Crossbar H-mode (CH) cavities at GSI. The first section of the HELIAC has been successfully commissioned in 2017. For advanced beam dynamics simulations, the 6D input distribution from the HLI must be known precisely. Following transverse measurements, the beam density in the longitudinal phase plane is therefore reconstructed. This is realized by combining a set of beam shape measurements with the Feshenko Monitor in the time domain and particle tracking code. Description of the method and progress towards a 6D phase space characterization is presented.

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